What is claimed is:

1. A method for detecting a compressor instability in a multiple compressor refrigeration system, the method comprising the steps of:

determining an operating parameter from both a first compressor of a multiple compressor refrigeration system and a second compressor of the multiple compressor refrigeration system;

comparing the operating parameter of the first compressor to the operating parameter of the second compressor;

determining an inlet vane position for both the first compressor and the second compressor;

comparing the inlet vane position of the first compressor to the inlet vane position of the second compressor; and

determining a compressor instability in one of the first compressor and the second compressor in response to the one of the first compressor and the second compressor having both a lower operating parameter and a more open inlet vane position than the other compressor of the first compressor and the second compressor.

2. The method of claim 1 further comprising the step of closing inlet vanes on both the first compressor and the second compressor until the determined compressor instability in the one of the first compressor and the second compressor is corrected.

3. The method of claim 1 further comprising the steps of:

determining a number of times the one of the first compressor and the second compressor has had a compressor instability within a predetermined time period;

comparing the determined number of times to a predetermined number of instabilities; and

stopping the one of the first compressor and the second compressor in response to the determined number of times being greater than the predetermined number of instabilities.

4. The method of claim 3 wherein the predetermined number of instabilities is 3 and the predetermined time period is 60 minutes.

5. The method of claim 1 wherein the step of determining an operating parameter includes the steps of:

measuring a motor current of the first compressor; and

measuring a motor current of the second compressor.

6. The method of claim 5 wherein the step of determining an operating parameter further includes the steps of:

calculating a percentage of full load motor current for the first compressor using the measured motor current of the first compressor and a full load current value for the first compressor; and

calculating a percentage of full load motor current for the second compressor using the measured motor current of the second compressor and a full load current value for the second compressor.

7. The method of claim 6 further comprising the steps of:

calculating a reference value using the operating parameter of the first compressor and the operating parameter of the second compressor;

comparing the calculated reference value to a predetermined value; and

wherein the step of comparing the inlet vane position of the first compressor to the inlet vane position of the second compressor occurs in response to the calculated reference value being less than the predetermined value.

8. The method of claim 7 wherein the step of calculating a reference value includes the step of calculating a ratio value using the calculated percentage of full load motor current for the first compressor and the calculated percentage of full load motor current for the second compressor, wherein the ratio value is the ratio percentage of the calculated percentage of full load motor current for the first compressor and the calculated percentage of full load motor current for the second compressor.

9. The method of claim 8 wherein the ratio value is less than 100 percent and the predetermined value is between about 60 percent and about 90 percent.

10. The method of claim 9 wherein the predetermined value is 80 percent.

11. The method of claim 6 further comprising the steps of:

calculating a reference value using the operating parameter of the first compressor and the operating parameter of the second compressor;

comparing the calculated reference value to a predetermined value; and

wherein the step of comparing the inlet vane position of the first compressor to the inlet vane position of the second compressor occurs in response to the calculated reference value being greater than the predetermined value.

12. The method of claim 11 wherein the step of calculating a reference value includes the step of calculating a difference value using the calculated percentage of full load motor current for the first compressor and the calculated percentage of full load motor current for the second compressor, wherein the difference value is the difference between the calculated percentage of full load motor current for the first compressor and the calculated percentage of full load motor current for the second compressor.

13. The method of claim 12 wherein the predetermined value is 20 percent.

14. The method of claim 1 wherein the step of determining an operating parameter includes the steps of measuring one of a discharge temperature and a discharge flow rate for both the first compressor and the second compressor.

15. A computer program product embodied on a computer readable medium and executable by a microprocessor for detecting a compressor instability in a multiple compressor refrigeration system, the computer program product comprising computer instructions for executing the steps of:

determining an operating parameter from both a first compressor of a multiple compressor refrigeration system and a second compressor of the multiple compressor refrigeration system;

calculating a reference value using the operating parameter of the first compressor and the operating parameter of the second compressor;

comparing the calculated reference value to a predetermined value;

determining an inlet vane position for both the first compressor and the second compressor;

comparing the inlet vane position of the first compressor to the inlet vane position of the second compressor in response to the calculated reference value being less than the predetermined value; and

determining a compressor instability in one of the first compressor and the second compressor in response to the one of the first compressor and the second compressor having both a lower operating parameter and a more open inlet vane position than the other compressor of the first compressor and the second compressor.

16. The computer program product of claim 15 further comprising computer instructions for executing the step of closing inlet vanes on both the first compressor and the second compressor until the determined compressor instability in the one of the first compressor and the second compressor is corrected.

17. The computer program product of claim 15 further comprising computer instructions for executing the steps of:

determining a number of times the one of the first compressor and the second compressor has had a compressor instability within a predetermined time period;

comparing the determined number of times to a predetermined number of instabilities; and

stopping the one of the first compressor and the second compressor in response to the determined number of times being greater than the predetermined number of instabilities.

18. The computer program product of claim 17 wherein the predetermined number of instabilities is 3 and the predetermined time period is 60 minutes.

19. The computer program product of claim 15 wherein the step of determining an operating parameter includes the steps of:

measuring a motor current of the first compressor; and

measuring a motor current of the second compressor.

20. The computer program product of claim 19 wherein the step of determining an operating parameter further includes the steps of:

calculating a percentage of full load motor current for the first compressor using the measured motor current of the first compressor and a full load current value for the first compressor; and

calculating a percentage of full load motor current for the second compressor using the measured motor current of the second compressor and a full load current value for the second compressor.

21. The computer program product of claim 20 wherein the step of calculating a reference value includes the step of calculating a ratio value using the calculated percentage of full load motor current for the first compressor and the calculated percentage of full load motor current for the second compressor, wherein the ratio value is the ratio percentage of the calculated percentage of full load motor current for the first compressor and the calculated percentage of full load motor current for the second compressor.

22. The computer program product of claim 21 wherein the ratio value is less than 100 percent and the predetermined value is between about 60 percent and about 90 percent.

23. The computer program product of claim 22 wherein the predetermined value is 80 percent.

24. A stability control system for a refrigeration system comprising a lead compressor, a lag compressor, a condenser, and an evaporator connected in a closed refrigeration circuit, the lead compressor and the lag compressor each having a plurality of inlet guides vanes adjustable by an actuator, the stability control system comprising:

a first sensor being configured and disposed to detect an operating parameter of the lead compressor and to generate a first signal corresponding to the detected operating parameter of the lead compressor;

a second sensor being configured and disposed to detect a position of the plurality of inlet guide vanes of the lead compressor and to generate a second signal corresponding to the detected position of the plurality of inlet guide vanes of the lead compressor;

a third sensor being configured and disposed to detect an operating parameter of the lag compressor and to generate a third signal corresponding to the detected operating parameter of the lag compressor;

a fourth sensor being configured and disposed to detect a position of the plurality of inlet guide vanes of the lag compressor and to generate a fourth signal corresponding to the detected position of the plurality of inlet guide vanes of the lag compressor; and

a microprocessor configured to receive the first signal, the second signal, the third signal and the fourth signal during normal operation of the refrigeration system, and to generate control signals for the actuators of the plurality of inlet guide vanes of the lead compressor and the lag compressor by applying the first signal, the second signal, the third signal and the fourth signal to a control algorithm configured to determine a surge condition in one of the lead compressor and the lag compressor.

25. The stability control system of claim 24 wherein the microprocessor generates the control signals for the actuators of the plurality of inlet guide vanes of the lead compressor and the lag compressor in response to the control algorithm determining one of the lead compressor and the lag compressor has entered a surge condition by having both a lower operating parameter and a more open inlet vane position than the other compressor of the lead compressor and the lag compressor.

26. The stability control system of claim 25 wherein the control signals generated by the microprocessor instruct the actuators of the plurality of inlet guide vanes of the lead compressor and the lag compressor to close the plurality of inlet guide vanes of the lead compressor and the lag compressor.

27. The stability control system of claim 25 wherein the control signals generated by the microprocessor shut down the lag compressor in response to the control

algorithm determining that the one of the lead compressor and the lag compressor has entered a surge condition a predetermined number of times in a predetermined time period.

28. The stability control system of claim 24 wherein:

the first sensor comprises means for measuring one of motor current and power consumption for the lead compressor; and

the third sensor comprises means for measuring one of motor current and power consumption for the lag compressor.

29. The stability control system of claim 28 wherein the microprocessor calculates a percentage of full load power consumption for each of the lead compressor and the lag compressor and applies the calculated percentages of full load power consumption for the lead compressor and the lag compressor to the control algorithm to generate the control signals.

30. The stability control system of claim 24 further comprising:

an analog to digital converter to receive the first signal, the second signal, the third signal and the fourth signal from the first sensor, the second sensor, the third sensor and the fourth sensor and to convert the first signal, the second signal, the third signal and the fourth signal to digital signals for the microprocessor; and

an interface board to receive the control signals from the microprocessor and to provide them to the actuators of the plurality of inlet guide vanes of the lead compressor and the lag compressor.